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Journal of Complex Networks - Decision on Manuscript ID CONNET-2014-084

moore@santafe.edu <moore@santafe.edu> Tue, Feb 3, 2015 at 9:42 PM
To: agutfraind.research@gmail.com, agutfrai@uic.edu

03-Feb-2015

Dear Prof. Gutfraind,

Manuscript ID CONNET-2014-084 entitled "Network installation and recovery: approximation lower bounds and faster exact formulations" which you submitted to the Journal of Complex Networks, has been reviewed. The comments of the reviewer(s) are included at the bottom of this letter.

The comments indicate that some fundamental revisions are necessary before the paper can again be considered for publication in Journal of Complex Networks. Therefore, I invite you to respond to the reviewer(s)' comments and revise your manuscript.

In particular, please respond to reviewer #2 and address to what extent this paper improves over ref. [6] (which shares the first author with this submission) and why these results are not a merely incremental improvement.

To revise your manuscript, log into https://mc.manuscriptcentral.com/comnet and enter your Author Centre, where you will find your manuscript title listed under "Manuscripts with Decisions." Under "Actions," click on "Create a Revision." Your manuscript number has been appended to denote a revision.

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When submitting your revised manuscript, you will be able to respond to the comments made by the reviewer(s) in the space provided. You can use this space to document any changes you make to the original manuscript. In order to expedite the processing of the revised manuscript, please be as specific as possible in your response to the reviewer(s).

IMPORTANT: Your original files are available to you when you upload your revised manuscript. Please delete any redundant files before completing the submission.

Because we are trying to facilitate timely publication of manuscripts submitted to the Journal of Complex Networks, your revised manuscript should be uploaded as soon as possible. If it is not possible for you to submit your revision in a reasonable amount of time, we may have to consider your paper as a new submission.

Once again, thank you for submitting your manuscript to the Journal of Complex Networks and I look forward to receiving your revision.

Sincerely,
Prof. Cristopher Moore

Editor, Journal of Complex Networks
moore@santafe.edu

Reviewer(s)' Comments to Author:

Reviewer: 1

Comments to the Author
* The illustration in Figure 1 is confusing. Can you please replace it with a better formulation to compute the cost function? The example in [6] is clear.
* It is somewhat unusual to refer a paper [6] with its second author (Bradonjic et al.). Please use the first author's name.

Reviewer: 2

Comments to the Author
This paper studies the network recovery problem, where the goal is to reconstruct a network one node at a time and the cost of recovery for a node depends on the existing edges on the network. The paper defines the problem shows that it is strongly NP-hard; gives a lower bound for approximation, and proposes a new integer programming formulation that is faster than a previous one.

The paper improves on an existing paper (cited as [6]) published on the same journal in 2014, and the first authors for the two papers are the same. It was puzzling to me why the authors chose to refer to [6] with the name of the second author as Brandojic et al.

I find the contributions of this paper to be very incremental and I do not think they are significant enough for a new publication. The strong NP-completeness result comes directly from the max-clique problem. I don't think a separate construction is necessary. One can just state that the max-clique problem is an instance for this problem and move on. Similarly, the lower bound result follows from results on the clique problem. Along the same lines, any bound for the clique problem would apply to the recovery problem as a lower bound. And I do not think stating these would merit a new paper.

The "new" integer programming formulation is based on a paper published in 1960, and can be applied to any problem that includes ordering of a larger set (edges in this case) is dictated by ordering of a smaller set (vertices). These cuts have been applied to other ordering problems such as the traveling salesperson problem. And I would expect any computational study to use such cuts anyway. So I do not think introducing these cuts from 1960 is a significant contribution either.

In summary, I find the contributions of this paper not to be significant enough for publication in this journal.

Reviewer: 3

Comments to the Author
The paper studies an interesting combinatorial formulation for a network recovery problem developed in an earlier paper. The main contributions are hardness results for the decision and approximation versions, under a convex decreasing cost function. They also study the fixed parameter complexity. An interesting observation is the structural result about how connectivity changes the cost of the solution. The final result is a simple IP and its evaluation. The paper is generally pretty well written.

The technical contributions are borderline. Strengthening them either in terms of the theoretical results or the empirical results would be good.

Lemma 1: instead of "as above", it would be better to refer to the proof of theorem 5. Also, I assume \sigma is the optimal traversal. This should be stated. The proof needs more clarification. In case 1, why are the u_i's all free? Case 2 is also not very clear.

Proof of theorem 7: it will be good to clarify why the nodes after k are free if we have a C-approximation. The last part of this proof should also be explained further.

section 4, para 1: there might be some functions for which one can construct greedy traversals which are not connected. I believe the correct statement is that there exists a greedy traversal that is connected. This should be clarified.

The experimental results section is pretty sparse. What kinds of graphs were used? The only observation here is about the running time. It might be good to add some more experimental results, and see what the structure of the solution is.

- introduction, para 2: Bradonjic et al. should be Gutfraind et al.
- page 3, para 2: "NANIP model" --> "NANIP problem"
- page 3, para 3: "Similarly to ..." --> "Similar to"